

EXPLANATION OF PLATE LVI.

- Fig. 1. *Ovulum vidleri*, p. 638.
 2. *Cancellaria wilmeri*, p. 637.
 3. *Conus prevosti*, p. 636.
 4. — *thomasi*, p. 635.
 5. — *gloynei*, p. 637.
 6. — *lombci*, p. 637.
 7. — *bocki*, p. 636.
 8. *Cypræa pyriformis*, var. *smithi*, p. 638.

3. Notes on the Anatomy and Systematic Position of the Jaçanáas (*Parridæ*). By W. A. FORBES, B.A., Prosector to the Society.

[Received April 8, 1881.]

It having lately been my good fortune to dissect two specimens of *Parra jacana*, from Pernambuco, and an eviscerated specimen of *Metopidius africanus*, as well as to examine skeletons and skins of some other species of this group, a few notes on their anatomy may be acceptable to the Society, the more so on account of the very considerable difference of opinion that has hitherto existed amongst systematic ornithologists as to the true relationships of this group. Two main views on this subject have been put forward, one placing the Jaçanáas near the Rails (*Rallidæ*), the other asserting that they are, essentially, modified Plovers. The former of these views has been maintained by Jerdon¹, Sundevall², and Milne-Edwards³, to mention only some of the most recent ornithological writers of importance, as well as by the illustrious Nitzsch in his classical memoir on the pterylography of birds⁴. The latter view has been adopted by Messrs. Scclater and Salvin in their 'Nomenclator,' where the Parridæ are interpolated between the Œdicnemidæ and the Charadriidæ as members of the order "Limicolæ"⁵. The late Prof. Garrod,

¹ Birds of India, iii. p. 707.

² Tentamen, p. 130 (1872).

³ Oiseaux Fossiles, ii. p. 110 (1869-71).

⁴ Pterylography, Ray Society's edition, p. 126.

⁵ *Op. cit.* p. 142 (London, 1873). The term "Limicolæ" was, I believe, originally used by Nitzsch (Pterylogr. p. 194) to include the birds now included in the "families" Charadriidæ and Scolopacidæ, together with some aberrant forms, such as *Dromas*, *Cursorius*, *Thinocorus*, &c. By Messrs. Scclater and Salvin its use is still further extended to include the Œdicnemidæ, Parridæ, and Chionididæ in addition. Lastly, Prof. Garrod used it (P. Z. S. 1874, p. 122, &c.) as a term for all the non-columbine "Charadriiformes," including in it, besides Nitzsch's groups, the Cranes, Auks, Gulls, and, presumably, the Turnicidæ, Rhinochetidæ, Plataleidæ, and Parridæ as well. In fact, Garrod's restricted "family" Charadriidæ corresponds pretty nearly to the whole of Nitzsch's "Limicolæ seu Scolopacinx." To obviate further confusion, the term "Limicolæ" should be restricted to the group mentioned by Nitzsch; and I propose to substitute, as a name for the non-columbine Charadriiformes (the "Limicolæ" of Garrod) the word "Pluviales," to correspond with the other division, "Columbæ" (including the Columbidæ and Pteroclidæ), of that great group.

in his paper on the nasal bones of birds¹, says that "*Parra* should be removed to the Charadriomorphæ" from the Rallidæ, on account of the schizorhinal nature of its skull, as represented in the figure of that of *Parra (Hydralector) cristata* on p. 34 of his paper. In his subsequent paper on the muscles of the thigh in birds², *Parra* (i. e. *Metopidius*) *africana* is placed amongst the "Grallæ," with the other Charadriine or Scolopacine forms, and not included in the Rallidæ. It will be my object in the present paper to still further strengthen this latter view of the affinities of the Parridæ³.

Pterylosis.

Nitzsch, in his 'Pterylography,' places *Rallus*, *Crex*, *Porphyrio*, and *Parra* as members of a group of the Fulicariæ, characterized by the narrow form of the tracts, by the presence of a distinct outer branch to the inferior tract, and by the dorsal tract being "neither interrupted nor strikingly weakened" between the shoulder-blades. He says (*l. c.* p. 126):—"The first three [genera] have *twelve* tail-feathers, and exactly the same pterylosis as that figured as occurring in *Rallus aquaticus*. In *Parra*, of which I have examined all the four principal species (*sinensis* [i. e. *Hydrophasianus chirurgus*], *ænea*, *africana*, and *jassana*), I found only *ten* tail-feathers, and a remarkable narrowing of the bands of the dorsal tract close behind the shoulder-blades; whilst, on the other hand, the hindmost, or pelvic portion of it, was dilated. This genus has also weaker lumbar tracts; and these are united with the uropygial portion of the dorsal tract by sparse contour-feathers." As Nitzsch himself later on says that the pterylosis of the "Limicolæ" closely approaches that of the Rallinæ, and is but little modified from that type, the evidence from pterylosis of the Ralline affinities of the Jaçanás is not very strong. In their possession of well-marked firm rectrices, in the weakness of the lumbar tracts, and in the tendency to a division of the dorsal tract into an anterior and a posterior fork, the Parridæ differ from the typical Rallidæ, and approach the Limicoline type. The same relationship is indicated by the inner, or main, pectoral tract, though very narrow, consisting, at least at its commencement, of two or three rows of feathers in the Parridæ, as well as in the Charadriidæ; whereas in the typical Rallidæ, according to Nitzsch, it issues from the branch as only a single row of feathers.

Visceral Anatomy, &c.

The tongue is long and narrow in shape, thin, and of horny consistency. Its apex is slightly notched, and its base spinulose; for the greater part of its length it is strongly concave. The œsophagus develops no crop; and the proventriculus is zonary. There

¹ "On the Value in Classification of a Peculiarity in the Anterior Margin of the Nasal Bones of certain Birds," P. Z. S. 1873, pp. 33-78.

² P. Z. S. 1873, pp. 626-644.

³ Besides *Metopidius africanus*, Prof. Garrod dissected a specimen of *Hydrophasianus chirurgus*; and some MS. notes of his on that species I have incorporated in what follows.

is a muscular gizzard, lined by a rather thick and hard epithelium. The contents of the stomach, in one of the specimens examined, consisted of small seeds mixed with vegetable débris and small fragments of stone. The right liver-lobe is elongated, and twice as large as the left; and there is a well-developed gall-bladder. The cæca are lateral in position, and closely approximated to the intestine, which makes them difficult to see. They are mere nipples $\cdot 2$ inch long¹. In this respect *Parra* differs from all the Rallidæ (except *Porzana notata*) which have been examined, as in all of these the cæca are long, sometimes very long. Of the Pluvialine birds, only the Plataleidæ and Rhinocetidæ, with *Sterna*, *Larus*, and one or two others, have such short cæca. The intestines measure, in these two specimens of *Parra jacana*—small intestine 12·3 and 13·2 inches, large intestine 1·1 and 1·0 inch respectively.

In *Parra jacana* and in *Hydrophasianus africanus*, as also in *Metopidius africanus*, as already recorded by Garrod², there are two carotid arteries. This is the number found in all the Rallidæ, and in most of the Pluviales, excepting the Turnicidæ and *Arctica alle*, according to Garrod³, where there is only the left developed.

Myology.

Parra jacana resembles *P. (Metopidius) africana*, as recorded by Garrod⁴, in possessing the ambiens, femoro-caudal, accessory femoro-caudal, semitendinosus, and accessory semitendinosus muscles, all well developed⁵. Their formula is therefore AB . XY⁶. In both these species the gluteus primus is well developed, covering the biceps superficially towards the median line; the gluteus quintus is also well developed. As in the Rallidæ, and the Gruidæ⁷ and *Eurypyga*, amongst the Pluviales, the area of origin of the obturator internus is triangular, as it is also in *Hydrophasianus*; in the Pluvialine birds generally it is oval. The two deep flexor tendons of the foot are not at all ossified, but completely blend together some way up the leg—in *Metopidius*, in fact, just below the joint. There is no slip at all to the hallux, as was also found to be the case in *Parra africana*⁸ and *Hydrophasianus* by Prof. Garrod. This is the more remarkable on account of the very large size of the hallux in all these birds. A special tendinous slip to that digit is very frequently present in birds which have a very insignificant hallux indeed; and I know of no other case of a bird with such a large hallux as that of the Parridæ lacking the tendon. This fact would seem to indicate that the Parridæ may have been developed from some form with a more normal-sized foot and a small hallux, which had no

¹ In *Hydrophasianus chirurgus* there is a strong gizzard, and the left liver-lobe is smaller than the right; the cæca measure $\cdot 15$ inch, the whole length of the intestines being 12 inches.—Garrod's MSS.

² P. Z. S. 1873, p. 469.

³ L. c. pp. 469, 470.

⁴ P. Z. S. 1873, p. 641.

⁵ In *Hydrophasianus* all these five muscles are also present.

⁶ Cf. Garrod, P. Z. S. 1874, p. 123.

⁷ Garrod, P. Z. S. 1876, p. 199.

⁸ P. Z. S. 1875, p. 348.

special long flexor, the great size of their feet having been developed in accordance with their peculiar habits.

In the anterior extremity the second pectoral arises from nearly the whole length of the sternum; in all three genera the third pectoral is wanting. The expensor secundariorum is strong and T-shaped, as in all Ralline and many Pluvialine birds. In *Parra jacana* (as in *Hydrophasianus*, according to Garrod) there is a distinct biceps slip to the patagium, as in all the Rallidæ, the Charadriidæ, Gruidæ, and many other Pluvialine birds. In *Metopidius africanus* it is apparently absent, the absence being probably correlated with the peculiar expanded form of the radius (to be hereafter described).

In the wing-membrane the *tensor patagii brevis* presents a peculiar arrangement, the tendon being completely divided into two portions—an inner, more slender, and an outer, stronger one. The former runs on to the fibrous tissue near the superficial origin of the *extensor metacarpi radialis longior*, and there stops; the latter continues over this last muscle to the ulnar side of the arm, where it is lost in the fibrous covering-tissue adjacent. Before crossing, however, it sends off a short, special wristward slip to the superficial tendon of origin of the metacarpal *extensor*, as in many other groups of birds. There is also a thin fibrous expansion given off just before this to the tendon of the *tensor patagii longus*, and the tissue of the patagium generally, as in many Pluvialine birds¹. This splitting up of the *tensor patagii brevis* tendon into two distinct slips, the external one in turn giving off a special wristward slip, occurs in many Pluvialine birds (*e. g.* in *Numenius arquatus*, *Totanus calidris*, *Machetes pugnax*, *Himantopus nigricollis*, *Thinocorus*, and *Attagis*), but never in the Rails, where the tendon is always much more simple, not being divided into two separate parts, or giving off a wristward slip. In fact, in most Rallidæ it runs quite simply, as a narrow straight tendon, onto the origin of the *extensor metacarpi* muscle, and there stops.

The trachea is provided with the usual pair of sterno-tracheal muscles; and the lower larynx, which is of simple structure, has also only a single pair of intrinsic muscles.

Osteology.

From a consideration of the pterylographic, visceral, and myological features only of the Parridæ, perhaps no very definite conclusion as to their affinities could be drawn. But their osteological characters, in this case, leave no doubt as to their real position. All the skulls of Parridæ which I have examined, including those of *Parræ jacana* and *gymnostoma*, *Metopidii indicus*, *africanus* and *albinucha*, and *Hydrophasianus chirurgus*, like that of *Hydralector cristata* figured by Garrod², are strongly schizorhinal, therein differing completely from that of the Rails, and resembling that of the

¹ In *Hydrophasianus* much the same arrangement of the *tensor patagii brevis* obtains, to judge from a small drawing in Garrod's MS.

² P. Z. S. 1873, p. 34, fig. 5.

Pigeons, Plovers, and their allies (the "Charadriiformes" of Garrod¹) only amongst Homalognatous birds.

There are well-developed basiptyergoid processes, which are always absent in the Rails, though of very frequent occurrence amongst the "Pluviales," occurring in all the Charadriinæ and Scolopacinæ I have examined.

In *Parra jacana* and *Metopidius albinucha*, the long, narrow, slightly decurved vomer is emarginate apically, as in certain Cha-

Fig. 1.



Skull of *Parra jacana*, from below; natural size.

radriidæ² (see fig. 1). In the Rallidæ it is, I believe, always sharp at the point.

The maxillo-palatine processes are rather slender and directed backwards; they have the form of concavo-convex lamellæ, are not at all swollen, and do not unite by some way in the middle line, the vomer appearing between and (when the skull is viewed from the palatal aspect) below them.

There is no ossified internasal septum, nor any ossification of the narial cartilages. The lacrymal is small, ankylosed with the nasofrontal region of the skull above, and with the "pars plana" below.

On the posterior aspect of the skull there are no traces of the occipital fontanelles, which are found in so many of the birds related to the Plovers.

The supraorbital impressions for the nasal glands, which are so conspicuous in most Plovers, the Gulls, Auks, and many other birds, are absent in the Parridæ.

The combinations depending on the presence or absence of basiptyergoid processes, of occipital foramina, and of impressions on the top of the skull for the supraorbital glands, coincide, as may be seen from the following table, pretty accurately, with hardly an exception, with the chief groups of the Pluviales (the web-footed Laridæ and Alcidæ being omitted as irrelevant to our present purpose) as determined by other characters. In the Table + and - represent respectively the presence or absence of the structure indicated. In the Plataleidæ and Gruidæ the nasal glands occupy the truncated edge of the cranium above the orbits, and hardly appear on its upper surface: this condition I have indicated by the use of the double sign (\pm).

¹ P. Z. S. 1874, p. 117.

² Cf. Garrod, P. Z. S. 1877, p. 417, figs. 2-4.

	Occipital foramina.	Basiptery- goid pro- cesses.	Supraorbi- tal impres- sions.
PLATALEIDÆ.			
<i>Ibis rubra</i>	+	-	±
<i>Platalea ajaja</i> ¹	+	-	±
— <i>leucorodia</i>	+	-	±
GRUIDÆ.			
<i>Grus cinerea</i>	+	-	±
— <i>americana</i>	+	-	±
— <i>australasiana</i>	+	-	±
<i>Aramus scolopaceus</i>	+	-	±
CHARADRIIDÆ.			
<i>Numenius arquatus</i>	+	+	+
— <i>phaeopus</i>	+	+	+
<i>Recurvirostra avocetta</i>	+	+	+
<i>Tringa canutus</i>	+	+	+
— <i>cinclus</i>	+	+	+
<i>Ægialites hiaticula</i>	+	+	+
<i>Eudromias morinellus</i>	+	+	+
<i>Vanellus (cristatus?)</i>	+ _I	+	+
<i>Machetes pugnax</i>	+	+	+
<i>Hæmatopus ostralegus</i>	+	+	+
<i>Himantopus nigricollis</i>	+	+	+
<i>Limosa melanura</i>	+	+	+
PARRIDÆ.			
<i>Metopidius albinucha</i>	-	+	-
— <i>indicus</i>	-	+	-
<i>Parra jacana</i>	-	+	-
<i>Hydrophasianus chirurgus</i>	-	+	-
TURNICIDÆ.			
<i>Turnix lepurana</i>	-	+	-
<i>Hemipodius varius</i>	-	+	-
? —			
<i>Dromas ardeola</i> ²	-	-	+
<i>Chionis alba</i>	-	-	+
<i>Attagis gayi</i>	-	-	+
<i>Thinocorus rumicivorus</i>	-	-	+
— <i>dorbignyanus</i>	-	-	+
<i>Cursorius gallicus</i>	-	-	+
<i>Glareola pratincola</i>	-	-	+
RHINOCETIDÆ.			
<i>Rhinocetus jubatus</i>	-	-	-
<i>Eurypyga helias</i>	-	-	-
MESITIDÆ.			
<i>Mesites unicolor</i> ³	-	-	-

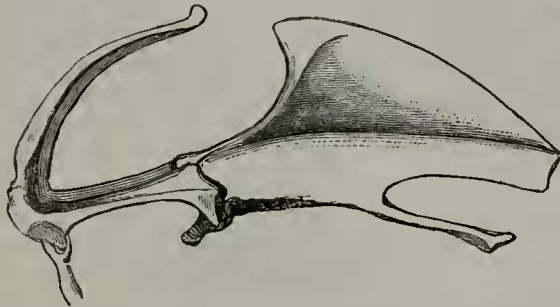
¹ Sometimes ossified.

² There is a perfect skeleton of this peculiar form in the Cambridge University Museum, which I have examined.

³ I only know the cranial characters of this bird from the plate illustrating M. Milne-Edwards's memoir (Ann. Sci. Nat. [6] vol. vii. art. no. 6).

The drawing (fig. 2) of the sternum of *Metopidius albinucha* will show how unlike it is to that of the Rallidæ. In the latter group the sternum is always peculiar in that the xiphoid processes exceed in length the body of the sternum, which tapers to a point posteriorly, and from which they are separated by very long and well-marked triangular notches. The carina sterni also is less well developed; and the clavicles are weaker and straighter, being less convex forwards, than in the Parridæ. The sternum and clavicles

Fig. 2.



Sternum and shoulder-girdle of *Metopidius albinucha*, viewed laterally; natural size.

of *Parra* and *Metopidius* in general form, on the other hand, resemble closely the type found in some of the Pluvialine birds (e. g. *Thinocorus*, *Attagis*).

The pelvis, again, of the Rails presents certain well-marked peculiarities. If that of *Rallus aquaticus* be taken as a typical form, it will be found that the ilia are long and narrow, and but little expanded in their preacetabular part. The postacetabular portion of the pelvis is but little bent down on the preacetabular part; and the ischia and pubes are but little everted. The ischia are united by broad bony plates to about the three most posterior "sacral" vertebræ; between these plates and the expanded part of the ilia above are well-developed and deep fossæ, occupied, in the fresh state, by the posterior portion of the kidneys. Viewed from above, the well-marked "postacetabular" ridge, which divides off the dorsal from the lateral aspect of the pelvis, running from just behind the antitrochanteric eminence to the posterior spine of the ilium, presents, a little behind those two points, a strongly projecting process. The greatest breadth of the postacetabular part of the pelvis is therefore here, and not at the more anteriorly-situated prominence close to the antitrochanter. Viewed from the side, this ridge forms a sort of overlapping roof to the slightly excavated external pelvic fossa. The genera *Ocydromus*, *Aramides*, *Fulica*, and *Porphyrio* do not essentially depart from this type.

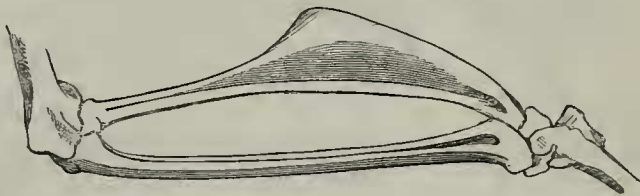
In *Parra* and *Metopidius*¹ the ilia are wider and more expanded

¹ Milne-Edwards has also described the difference of the pelvis in the Jaçanás as compared with that of the true Rallidæ: cf. 'Oiseaux Fossiles,' ii. p. 123.

anteriorly. The postacetabular ridge has hardly any median projection; and the pelvis is widest, dorsally, just behind the antitrochanters. The plates of bone between the ischia and sacrum are narrower, and the posterior part of the renal fossæ less well developed, and more open, in consequence. In all these points these forms thus approach the Limicoline birds.

There is one other point of interest in the osteology of the Parridæ. This is the extraordinary form assumed by the radius in some of the genera. In birds, as a rule, the ulna is a stouter bone than the radius, this last being almost universally a slender cylindrical bone. In *Metopidius africanus*, as already noticed by M. A. Milne-Edwards¹, as well as in *M. albinucha* and in *M. indicus* (as I have been able to ascertain by extracting the wing-bones from a skin), the radius presents the form shown in the drawing (fig. 3), being dilated and

Fig. 3.



Wing-bones of *Metopidius albinucha*, to show the peculiarly modified radius; natural size.

flattened into a subtriangular lamellar-like expansion for its distal half. Its superior surface is slightly grooved posteriorly for the tendon of the *extensor metacarpi radialis longior* muscle.

This dilated portion forms the margin of the patagial space for its distal portion. A considerable portion of the marginal tendon of the *tensor patagii longus* is inserted into the radius at the angle of the bone; the main tendon, however, continues in a groove on the inferior aspect of that bone, a little behind the border, to its ordinary insertion. About half of the peculiar flattened radius is left bare of muscle above, the *extensor metacarpi*, as already stated, playing over its lower half. Below, the flattened area is largely covered by the fibres of the *pronator radii superficialis*, which extend up nearly to the margin of the bone; below this is the *pronator radii profundus*, which likewise has an extensive insertion into the lower part of the bone. The margin of the bone, where it is superficial, is slightly roughened; and no doubt the peculiar form of radius is associated with the quarrelsome habits of these birds, this dilated and somewhat scimitar-shaped bone being probably capable of inflicting a very severe downward blow.

In *Parra jacana* and *P. gymnostoma* the radius presents the ordinary form; and the same is the case in *Hydrophasianus chirurgus*.

In these two genera, it is to be observed, the metacarpal "spur"

¹ 'Oiseaux Fossiles,' ii. p. 134.

is much more developed and sharp than in the species of *Metopidius*, where it is small and blunt; so that there is a correlation apparently between a sharp spur and a simple radius, and a blunt spur and flattened radius. In *Hydralector gallinacea* there is a blunt spur, with, so far as I can make out from a skin, a flattened radius.

The "claw" or "spur" of the wing of the Jaçanás has, it may be observed, no relation whatever to the "claw" or nail of the pollex, which is also present, though small, in all the three genera I have examined. The "spur," in *Parra jacana* at least, consists of an external, translucent, yellow epidermic layer, which invests a central core of compact fibrous tissue, this in turn being supported by a bony projection developed at the radial side of the first metacarpal.

As regards the position of the Parridæ in the group Pluviales, it appears to me that they form a well-marked family, with no very obvious relationships to any of the other families of that group, approaching, however, perhaps most nearly to the Charadriidæ, from which they are easily distinguishable by the absence of supraorbital glands and occipital foramina, by their enormously elongated toes, by the number of rectrices, and other points. A brief definition of the Parridæ may be given as follows:—

Charadriiform birds, with ten rectrices, short cæca, and a tufted oil-gland; with the ambiens, accessory femoro-caudal, and accessory semitendinosus muscles developed, and with the obturator internus triangular; with a two-notched sternum, and with the digits, including the hallux, greatly developed; with the skull provided with basiptyergoid processes, but lacking occipital foramina and supra-orbital gland-impressions.

4. Description d'une nouvelle Belette du Pérou septentrional.

Par L. TACZANOWSKI, C.M.Z.S.

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MUSTELA JELSKII, n. sp.

Minor, castaneo-brunnea, capite obscuriore; subtus isabellina; pedescorpori concolores; cauda corpore paulo brevior, apice nigra; mystacibus longissimis.

Hab. Peruvia bor. orient.

Un exemplaire d'une Belette pris par M. Jelski à Cutervo, au nord-est du Pérou, et déposé au Musée de Varsovie, voisin de la *M. macroura*, mais beaucoup plus petit, n'atteignant pas les dimensions de la *M. erminea* d'Europe, me semble appartenir à une forme inédite. Cet individu me paraît être adulte, car ses dents sont fort usées et le squelette fort durci.

La couleur générale est brune avec une nuance marron plus faible que dans la *M. macroura*, à tête distinctement plus foncée; celle de la moitié basale de la queue est analogue à celle du corps, passant ensuite en une légère teinte distinctement plus jaunâtre, l'extrémité même est d'un noir brunâtre sur l'espace d'un pouce et demi. Les